

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q79148

Masato KANEDA, et al.

Appln. No.: 10/582,787

Group Art Unit: 1795

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Examiner: Anca EOFF

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For: PHOTSENSITIVE COMPOSITION REMOVER

DECLARATION UNDER 37 C.F.R. § 1.132

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Kouichi Terao, hereby declare and state:

THAT I am a citizen of Japan;

THAT I graduated from the Applied Chemistry Department,
Faculty of Engineering, Niigata University in March, 1988;

THAT I finished the Master's Program of Applied Chemistry,
the Graduate School of Science and Technology, Niigata
University, in March, 1990;

THAT I have been employed by Showa Denko K.K. since April,
1990, where I was engaged in a project for manufacturing
acrylamide and development of a new acrylic resin in the
Kawasaki plant;

THAT I moved to the Higashinagahara Plant in March, 1993,
where I was engaged in research of a method for producing a
herbicide;

THAT I moved to the Tokuyama Plant in March, 1998, where I
was engaged in development of special reagents such as reagents
for analyzing low water content, dioxin and the like;

THAT since March, 2004, I have been engaged in development
of a photosensitive composition remover used in a process for
manufacturing a color filter in the Tokuyama Plant; and

THAT in order to demonstrate the unexpected superiority of
the present invention, the following experimentation was
conducted by me or under my direct supervision.

EXPERIMENTATION

EXPERIMENT

A composition of Example 4 of Wyatt et al. (US 2003/0118946 AI) was prepared, and cleanability for photosensitive compositions (resist materials) containing a red, green, blue or black pigment was evaluated, and was compared with that of a composition of the present invention.

The following two compositions were prepared.

Solvent mixture (A): 20 percent by weight of diisopropylbenzene, 20 percent by weight of benzyl alcohol, and 60 percent by weight of isoparaffinic hydrocarbon Exxon Isopar® L

Solvent mixture (B): 10 percent by weight of Solfine®-TM (a basically C₉ aromatic hydrocarbon-based mixed solvent, from Showa Denko K.K.), 10 percent by weight of SW 1500 (a basically C₁₀ aromatic hydrocarbon-based mixed solvent), 20 percent by weight of propylene glycol monomethyl ether, and 60 percent by weight of cyclohexanone

Solvent mixture (A) is a composition of Example 4 of Wyatt et al., and solvent mixture (B) is a composition according to the present invention

Results of Experiment

The obtained results of cleanability are shown in paragraph 4 of Appendix.

The results show that a remarkable amount of pigment remained when solvent mixture (A) was used, and that cleanability of solvent mixture (A), i.e., the composition of Example 4 of Wyatt et al. is remarkably inferior in cleanability

to solvent mixture (B), i.e., the composition of the present invention.

It was found that solvent mixture (A) disclosed in Wyatt et al. is not suitable for a remover for removal of an uncured photosensitive composition film containing a pigment.

CONCLUSION

In view of the above and Appendix, I conclude that the present invention provides unexpectedly superior results.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: September 3, 2010

By: Kouichi Terao
Kouichi Terao

APPENDIX

EXPERIMENT

1. Purpose

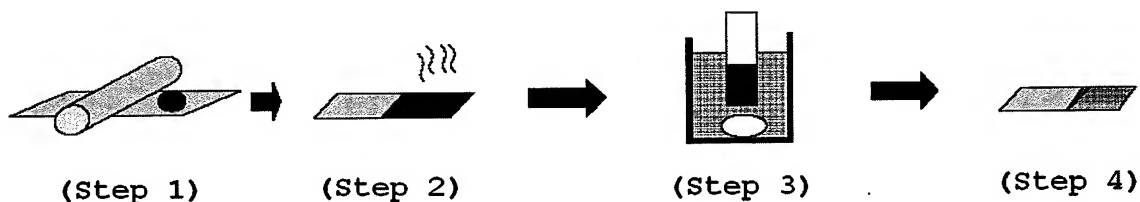
This experiment was to compare solvent mixtures' capacity to clean off a pigment-containing photosensitive composition, specifically to show difference in cleanability between the solvent mixture of Example 4 of Wyatt et al. and the solvent mixture according to the present invention.

2. Method

This experiment was performed in a manner similar to the method described in Example 1 on page 23 of the description of the present application.

Four pigment-containing photosensitive compositions were used. The first one contained a red pigment. The second one contained a green pigment. The third one contained a blue pigment. The fourth one contained a black pigment.

The method comprised the following four steps.



Step 1: Applying a pigment-containing photosensitive composition on a half surface of a substrate by a bar coater.

Step 2: Prebaking the applied substrate at 100°C for 1 minute for photosensitive compositions containing a red, green or blue pigment and at room temperature for 5 minutes for photosensitive compositions containing a black pigment.

Step 3: Immersing the applied part of the substrate in a solvent mixture with stirring for 1 minute.

Step 4: Drying.

3. Solvent Mixtures

Two solvent mixtures were prepared in the following mixing ratios in percent by weight.

	Aromatics			PGME	CYA	BZA	IP-L
	3MB	4MB	6MB				
Solvent mixture (A)			20			20	60
Solvent mixture (B)	10	10		20	60		

where

3MB: trimethylbenzene (Solfine®-TM, from Showa Denko K.K.)

4MB: tetramethylbenzene (Swasol 1500, from Maruzen Petrochemical Co., Ltd.)

6MB: diisopropylbenzene

PGME: propylene glycol monomethyl ether

CYA: cyclohexanone

BAZ: benzyl alcohol

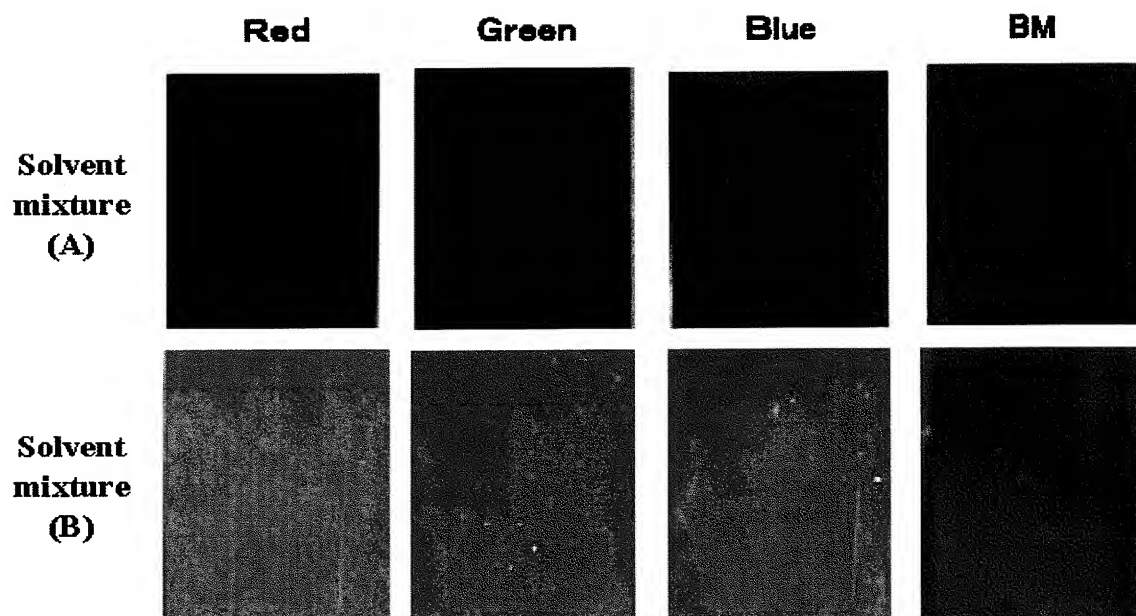
IP-L: isoparaffinic hydrocarbon EXXON Isopar® L

Solvent mixture (A) is a composition of Example 4 of Wyatt et al.

Solvent mixture (B) is a composition according to the present invention.

4. Results

Photographs of the substrate surfaces after step 4 are shown in the following table.



The results show that a remarkable amount of pigment remained when solvent mixture (A) was used.

The results also show that solvent mixture (B) according to the present invention has higher cleanability than solvent mixture (A) of Example 4 of Wyatt et al.